Amendments to the Specification:

Please amend the paragraph beginning at line 19 on page 1 with the following paragraph:

In cases where spatial information is required a typical solution is to perform multiple single-point measurements over different areas of the target, or scan the target. The resolution of the image is determined by the field of view of the detector. The main drawback of this technique is the length of time [[is]] it takes to compile the multiple points that make up a spectral image, which limits the practicality of imaging instruments utilizing this approach.

Please replace the paragraph beginning two lines from the bottom of page 1 with the following paragraph:

It is also known to use detector arrays to obtain spectral data. In a typical prior art instrument broadband near infrared light source may be used to illuminate a target. The light from the target is passed through either a set of fixed wavelength transmission [[filers]] filters or a tunable filter that passes only a narrow spectral band. The light is [[than]] then collected by an imaging detector array, which operates in the near infrared spectral range. The imaging array records the image of the target at a number of wavelengths and the collected data is used to construct a hyper-spectral cube consisting of the spectral responds of each point as a function of illumination wavelength. The performance of such prior art systems is limited by numerous factors:

- The intensity of a wideband source within a spectral band is inversely proportional to the bandwidth, therefore in order to increase the signal intensity of a given source the spectral resolution must be sacrificed.

- The use of discrete filters provides a limited data set consisting only of a small set of discrete wavelengths.

- Tunable filters, such as a liquid crystal tunable filter, limit the field of view of the camera as well as the intensity of the collected signal.

- The spectral range is limited by the material properties of the filters, e.g. liquid crystal tunable filters operate in the range of 1100-1800 nm, whereas significant spectral information is available at longer wavelengths.

Selecting a wavelength from a broadband light source either by dispersive elements or filters results in low intensity that limits the types of measurements and samples that can be analyzed.

Please amend the paragraph beginning four lines from the bottom of page 4 with the following paragraph:

First Preferred Embodiment

A first preferred embodiment of the present invention is shown in FIG. 1. A target 4 is illuminated over a wide spectral range with short duration spectrally narrow-band pulses using an optical parametric oscillator 2 pumped by laser 1. (The optical parametric oscillator may comprise a type I or a type II bulk non-linear crystal.) A number of two-dimensional images are captured by camera 7 at each narrow spectral range. Computer 30 controls the entire system as well as processes the data and analyzes it. The user of the instrument may select the operating parameters, such as the wavelength range, and the wavelength step size. Computer 30 commands the OPO to tune to the first wavelength and issues a command to fire the laser. The computer will then command the OPO to tune to the next wavelength and the process will repeat until the OPO will complete tuning over all the wavelengths in the pre-determined wavelength range selected by the user. For each laser pulse, the laser control electronics generates a timing pulse that is used to trigger the control electronics of the camera as well as the laser. The trigger pulse is set to precede the laser pulse to assure that the camera aperture is open when the laser fires. The camera electronics should be set for a short data acquisition time (such as less than 1 micro-second) in order to maximize the signal-to-noise ratio in presence of other light sources in the ambient. The OPO pulse is only about 5 ns, so there should be no

problem in synchronizing the illumination with the collection of the reflected light by the camera.

Please replace the paragraph beginning three lines from the bottom of page 6 with the following paragraph:

The camera can be an InGaAs FPA, such as offered by Sensors Unlimited which operates in the spectral range of 700-1700 nm, or an InSb Camera such as offered by Santa Barbara Focalplane that can cover the entire near infrared range and beyond. The spatial resolution of the image is defined by the field of view of each of the [[sensor (pixel)]] sensors (pixels) in the array. These cameras are available with more than 640.times.512 pixels in the array. The camera electronics controls the recording of the images and can provide time gating. The data acquisition should be synchronized with the firing of the laser, preferably such that the frame rate will be equal with the pulse repetition rate of the laser. The time gate of the camera will be adjusted to capture each reflected signal from the target.

Please replace the paragraph beginning at line 18 on page 7 with the following paragraph:

In this application the OPO is tuned over a wavelength range in the NIR associated with the spectral features of the active pharmaceutical ingredients and the excipient mixture, and the reflected light from the target is collected and recorded at each wavelength. The collected data provides the reflectivity at each point of the target (as set by the spatial resolution) for each wavelength. As described above, the data has three dimensions: two spatial and one that carries spectral information to provide a hyper-spectral cube. The data may also be presented to the user in the form of a two-dimensional picture, color-coded to represent the distribution of the different materials in the tablet.

Please replace the paragraph that begins at line 7 of page 8 with the following paragraph:

Reflective and Refractive Optics

The light from the OPO can be directed to the target by means of simple reflective and refractive optics such as mirrors and lenses, as presented schematically in FIG. 2. This approach may be preferable at NIR wavelengths [[were]] <u>where </u>some fibers exhibit high transmission losses.

Please replace the paragraph beginning at the top of page 9 with the following paragraph:

Transmission

[0035] Similar calibration can be performed for instruments that are configured to measure other optical parameters such as transmission, fluorescence etc. The instrument can be configured to obtain spectral imaging of transmitted light through the target. Images of transmitted light can provide integrated information of the material composition within the target in the volume acquired by each sensor in the array. FIG. 3 is a schematic drawing of a spectral imaging instrument operating in transmission mode. The basic components are the same as in FIG. 1 except that the light from the OPO is directed to one side of the target whereas the camera is placed on the opposite side. The OPO can be delivered by one or more fibers <u>such as fiber 9</u>, or by simple optics as discussed in FIG. 2<u>. Other optical components shown in the figures, including FIGS. 4 through 7, are lenses 5,8 and 18, beam directions 10, 21, 22 and 24, camera 13, targets 15 and 16 and mirrors 17.</u>

Please replace the paragraph in the middle of page 9 with the following paragraph:

Fluorescence

Other optical parameters can be acquired by a spectral imaging instrument to identify and analyze materials. The illumination of the target with the OPO beam can induce fluorescence emission at specific wavelengths, which can be imaged as a function of the

excitation (OPO) wavelength, as presented schematically in FIG. 4. Referring to this figure, a filter 11, or selection of filters to cover a broader wavelength region, is placed in front of the camera to block the OPO wavelength while transmitting the fluorescence from excited components of the sample.